

# Keyboarding Skills: Elementary, My Dear Teacher?

by  
Keith Wetzel

I had high hopes for the computers-in-composition program I was evaluating last year. I imagined students eagerly writing more than ever before, taking the time to rework their compositions as they became more efficient in using the word processor. Although the eight to ten year olds and eight teachers worked diligently, the program floundered. Students neither revised more nor wrote more using a word processor than they did using paper and pencil. And not only that—the students seldom reached the revising stage. Part of the problem was that each student had only 30 minutes per week at the computer, an unrealistic amount of time to achieve the program goals. However, clearly a bigger factor was that students worked inefficiently at the keyboard.

Students found the letters they needed with difficulty, and in so doing the flow of their thoughts was interrupted. I watched student after frustrated student scan handwritten notes for the last word typed, and then look down for the key that represented the first letter of the next word, look up at the screen to verify the letter and correct letter position—and then lose the place. Fingers would point and eyes would search from paper to keyboard to screen and back to paper. The cycle continued and the frustration grew.

When I realized that the problem was inadequate keyboarding skills, I reviewed the literature and found that other educators had noted similar concerns: Students wrote faster by hand than by word processor and hated typing (Gottschalk in Brady, 1984); furthermore, once they had typed their essays, students had little time for revising (Loud in *CCN-Forum*, 1982). I

found myself in general agreement. Although the third, fourth and fifth graders that I observed did not *hate* typing, they did enter text at a slower rate than their handwriting speed, and they often did not reach the revision stage of writing. The fact is, students who can't type have a hard time using a word processor.

What happens when students *can* type? Students who type better are more enthusiastic about using the computer for writing (Daiute et. al., 1981) and computer programming (Stoker, 1984). Students who have adequate keyboarding skills use their time at the computer efficiently—that is, they can concentrate on problem solving or composing, rather than on the mechanics of typing. *Keyboarding is too important to leave to chance.* For these reasons educators should make sure that keyboarding is taught and learned.

## Keyboarding Issues

The computer keyboard exists to accept and to enter information. Computer keyboarding skills are primarily typing skills, i.e., striking desired keys accurately and quickly, including the skills needed to correctly use special keys such as ESC and CTRL.

Educators wishing to make sound decisions about keyboarding curricula must address several questions:

### 1. What criterion ought to be set for keyboarding competence at the elementary school level?

Some authors suggest that students ought to type about 25 gross words per minute (gwpm) before using a computer application program (Kisner, 1984; Min-

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nesota Curriculum Services Center, 1984). However, I believe students need varying degrees of skill (this will be described in more detail later); 25 gwpm is not a realistic entry-level goal. (Gwpm is figured by dividing total keystrokes per minute by five, with no adjustment made for errors.) Students need to type quickly and accurately enough to make relatively efficient use of the computer and to accomplish the purposes of the academic program.

Most fourth through sixth graders can copy from seven to 10 gross words per minute by hand, depending on the grade level (Groff, reported in Graham and Miller, 1980). Consequently the criterion for adequate keyboarding skills should at least equal that suggested by the handwriting norms. I observed 26 third, fourth and fifth graders using word processors with no touch-typing instruction. The average rate of transfer of text from paper to screen was 2.5 gwp. This included a few students with some keyboarding skill. Those few who could type 7-10 gwp did not scan the keyboard to locate each key, did not become frustrated by keyboard input, and did not lose their place on the screen or on the paper. I conclude that students who achieve 10 gwp can make adequate use of the computer for tasks which require a significant amount of keyboard entry.

## 2. How much keyboarding is necessary?

The amount of time required for keyboarding instruction depends upon the computer application. Figure 1 illustrates my estimations of the keyboarding skill needed at the computer to accomplish various educational tasks.

The greater the amount of data entry, the higher the keyboarding skills required. Programs such as *Rocky's Boots* require no keyboarding skills—users work with a joystick, Mouse or KoalaPad. Drill and practice programs typically require students to use only a few keys; many times, for example, students select among options with a single key-stroke. High-level keyboarding skills are required for entering computer programming code and for word processing.

Students acquire the "little" and "some" skill levels by learning how to move their fingers about the keyboard more quickly, starting from a base on the home row keys. To help students reach the "substantial" skill level, however, takes sustained time and effort.

## 3. How much time is needed for students to reach minimal proficiency in keyboarding?

Primary students can be taught the position of the home row keys and the correct finger for touching each key. This requires little additional instruction time. For example, when a reading lesson introduces a new letter, students can practice the letter on paper keyboards at their desks. If they can successfully use a computer for tasks that require a low level of keyboarding skill,

Degree of Keyboarding Skill Needed for Computer Applications			
Application	Amount of Skill Required		
• Logic Programs — <i>Rocky's Boots</i>	*		
• Art Programs — <i>KoalaPad</i>	*		
• Drill and Practice	*****		
• Computer Programming			
—Short programs	*****		
—Long programs	*****		
• Word Processing	*****		
	None	Little	Some
			Substantial

Figure 1.

they will be better prepared for keyboarding instruction when they enter grades three to five. This early preparation will become important to those teachers.

To effectively use a computer application requiring a "substantial" degree of keyboarding skills requires a keyboarding curriculum. Teachers and students must commit time daily to accomplish proficiency in entering code for computer programming or text for word processing. *Keyboarding instruction, however, cannot be integrated easily into the curriculum without replacing something; the question of time is critical.*

## "Keyboarding is too important to leave to chance."

Typing studies in the elementary school serve as examples of the time frame needed. McClurg (1984) found two studies which reported the typing speeds of intermediate students: Fifth and sixth graders typed an average of 40 wpm after one year of one-hour-per-day instruction (Ray, 1977), and fifth graders typed an average of 22 gwp after nine weeks of instruction at 45 minutes a day (Kercher, 1984). Lexie Hendersen-Lancett (1984) reports on the time required for teaching elementary-age students keyboarding and word processing skills:

"Children have shown they can learn both touch-typing and word processing in as little as eight hours! This enables them to create stories on the computer at speeds of 15 words per minute. This is quite adequate."

Such reports strengthen the case for the effectiveness of a minimal, but definite time allotment for keyboarding instruction.

Based on a review of the research, most students in grades three through five will average 10 gwp after receiving teacher instruction and practice on a microcomputer typing tutorial for 35 minutes per day for four weeks. If this schedule is extended to nine weeks, the average student will type 15 to 20 gwp. Computer programming, data base construction or word processing can begin when students achieve 10 gwp, which also gives them something to work toward. Students' speed and accuracy should continue to improve as they use the computer for academic tasks, especially if the teacher follows up on previous instruction and practice.

I recommend a keyboarding program which will accomplish this minimal goal (10 gwp) in a relatively short period of time. Elementary teachers are under many competing pressures to teach more subject areas in the course of a day. A keyboarding program has merit, but it does not deserve 50 minutes of daily instruction for a year! The benefits do warrant 35 minutes a day for four weeks in the intermediate grades. Not only will the investment be repaid through more efficient use of time at the keyboard, that minimum level of keyboarding skill is essential to some activities.

## 4. Who should teach keyboarding in the elementary school?

Some business education teachers argue that only persons such as business education majors or minors should teach keyboarding skills (Kisner, 1984; Holmquist, 1983; Alexander and Dickey-Olson in Schmidt, 1983). Clearly, persons trained to teach typing should do the teacher training, but I think regular classroom teachers should

instruct elementary students. Here the logistical problems and costs associated with using special teachers for keyboarding instruction must be balanced against the feasibility of such specialists training regular classroom teachers to do the instruction. Teachers who can type may be trained in as little as one day, and even those who do not type may be trained in as little as five weeks (Peggy Kennedy, 1984).

#### 5. How should keyboarding skills be taught?

Keyboarding is usually taught by the touch-typing method. A common method of teaching keyboarding skills is the standard typing instruction offered in business education courses at the secondary level. Software tutorials such as *Typing Tutor* and *Microtyping*, and typing games such as *Mastertype* and *Type Attack* also offer keyboarding practice. Students use such software to learn to type on their own without benefit of formal instruction, although not necessarily with touch-typing techniques.

to keep looking back and forth between the original and the keyboard." Business education teachers report that it is not easy to teach correct methods to students who have acquired improper typing habits (Stewart and Jones, 1983; Beverstock, 1984). Skills taught in the elementary school should be consistent with the skills students may subsequently need; for this reason I advocate the teaching of touch typing to elementary school students.

#### Program Considerations

##### Hardware

Few schools have a computer for each student. Beal and others (1983) found in a survey of schools in Washington state that only 36 percent of elementary schools had computers, and in those which had computers the student/computer ratio was 184 to one. In a nationwide survey, Henry Becker (1984) found that in elementary classrooms where students used computers, each student used one for an average of 20 minutes per week. If machine time is this limited,

- Has an academic area been identified that needs to be improved through the use of computers?
- Can the identified problem best be solved by a computer solution?
- Are enough computers available for students to achieve the goals of the program?
- Does the computer application require frequent and repeated use of most of the keyboard?

If answers to the above questions are "yes," a keyboarding program is needed. Figure 1 shows the amount of skill needed for specific applications, with a minimal keyboarding goal for each student of 10 gwpw using touch-typing techniques as much as possible.

#### Principles of Keyboarding Instruction

Most texts and manuals agree on principles of keyboarding instruction. The Minnesota Curriculum Services Center (1984) indicates, for example, that:

1. Kinesthetic feedback in practice is important.
2. Watching fingers and keys in the early stages of learning is helpful.
3. Early emphasis should be on speed, not accuracy.
4. Knowledge of results helps develop skills.
5. Elementary students need to use several approaches in the early stages of instruction, e.g., teacher dictation of keys, games and written drills.

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***"Students with adequate keyboarding skills can use their time at the computer efficiently ... on problem solving or composing rather than on the mechanics of typing."***

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Researchers have examined microcomputer typing tutorial approaches which included only limited emphasis on touch-typing techniques. Schmidt and Stewart (1983) found that non-typing college students who received 10 hours of keyboarding practice on a microcomputer typing tutorial program achieved speed and accuracy rates commensurate with expectations for students in standard classes after 10 hours of instruction. Students in the study did comment on the inadequacy of the instruction regarding correct fingering and the too-quick introduction of new keys. The success of this approach may depend on the quality of the software used to teach or reinforce touch-typing skills.

Touch typing is important in the elementary school for several reasons. Beyond the beginner stage, touch typing methods are superior to two-finger hunt-and-peck methods (Stewart and Jones, 1983; Kisner, 1984). Gentner and Norman (1984) explain: "Touch-typing's major advantage comes when transcribing a manuscript: It eliminates the need

there is no time—or need—to teach keyboarding. However, many elementary students now have much more access to computers.

##### Time

If school officials are planning to place computers in the elementary school, or already have a sufficient number, a keyboarding program may be needed. How much computer time must each student have to accomplish a significant task? The critical amount of time needed to make a significant difference, according to David Moursund (1984), is 30 minutes per student per day. Classroom approaching this level of computer use should include keyboarding curricula.

#### Keyboarding Curriculum

The specifications for a keyboarding curriculum have emerged from the discussion of the five questions discussed earlier. Before embarking on a keyboarding program, however, educators should ask these four threshold questions:

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**Instructional Periods**

Several sources suggest that instructional periods of 20 to 30 minutes are appropriate (Holmquist, 1983; Kisner, 1984; Minnesota Curriculum Services Center, 1984). After reviewing the research, I discussed the organization of a teaching period with keyboarding instructor Gale Daggett (1984), and observed her tutoring a student in keyboarding. I suggest this model:

**Objective**

- A. Use correct keyboarding technique.
- B. Use the *A* and *S* keys, and space bar on computer keyboard.

- One or two computers in a class can serve all the students.
- Nothing in the curriculum needs to be supplanted.

It should be noted that if students are regrouped out of their home classroom for much of the day, it is very difficult to schedule keyboarding practice.

The first two steps remain the same in the computer lab arrangement, but dur-

**Suggested Activity**

- 1.1 Students watch copy or screen rather than fingers or keyboard.
- 1.2 Teacher(s) or volunteer(s) demonstrate posture, arm and wrist position, and finger positions for home keys according to software or text used.
- 2.1 Teacher(s) or volunteer(s) demonstrate and students practice the *A* keyfinger and space bar and then the *S* keyfinger and space bar according to text or software used.
- 2.2 Students practice at desks as teacher monitors behaviors.
- 2.3 Continue to practice tasks via software and a variety of drills on the computer.
- 2.4 Practice real words as soon as possible.

**Classroom or Computer Lab Organization**

Elementary school computer(s) may be in the classroom or in a computer lab. Often the question is whether or not the computers should be divided equally among classrooms, where each classroom may have one or two computers—and perhaps just for part of a day. Both arrangements have advantages and disadvantages.

With a classroom arrangement:

1. The teacher presents a short lesson to the entire class on the skills to be practiced that day.
2. Students have a brief practice period at their desks.
3. Pairs of students practice at the computer throughout the day according to a schedule.

The advantages of a classroom arrangement are:

- Students do not need to leave the classroom to practice.
- The classroom teacher monitors student activities.

ing step three all students practice at the same time. For example, if an elementary school has 13 computers in the lab and 26 students in the class, all students can practice in pairs at the same time. While one student works at the keyboard, the partner dictates words, monitors technique and records scores. Students trade positions after three minutes of practice, with each student practicing for five periods of three minutes each. Typing tutorial programs require intense concentration, and distributed practice makes sense in this instance. However, the very best practice schedule is open to investigation. The advantages of a lab arrangement are:

- Students at the computer do not miss group instruction or disturb the class when they take turns.
- All students get a turn at the computer.
- The lab arrangement is the most efficient use of computer time (Becker, 1984).
- Practice comes immediately after teacher instruction.

In both arrangements the practice could be accomplished by a combination

of tutorials and games.

**Evaluation**

A keyboarding program should have both formative and summative evaluation questions. Typical formative evaluation questions are: "Is the program being implemented as planned?" "Are students practicing according to the schedule?" "Is teacher training for the program adequate?" "Is the software working?" "What program problems are solved and which problems remain to be resolved?"

A typical summative evaluation question is: "What percentage of the students met the exit criterion of 10 gwp/m?" Other summative questions regard the quality of the student technique and the accuracy of the typing.

Information gained from the formative evaluation helps improve the ongoing program; information gained from the summative evaluation helps determine whether the program has accomplished its objectives.

**Recommendations**

If frequent and repeated use of the keyboard is required to achieve program goals, students must be proficient at the keyboard. Keyboard technique should support, not hinder, achievement of problem solving or composing. But establishing keyboarding skills takes time. Is keyboarding instruction worth the time in the elementary school? The answer is found by balancing classroom time required to achieve keyboarding skills against the advantages gained by rapid keyboard entry of data now and later. If the program described here is followed, the time requirement is 20 days of instruction for 35 minutes a day—less than 12 hours. The advantages are:

- More efficient student use of computer time;
- Focused attention on the task to be accomplished, rather than on keyboarding mechanics;
- Early learning and accomplishment of touch-typing technique.

Keyboarding instruction is an investment in more efficient learning. I think the scale tips in favor of teaching keyboarding before grade six. Keyboarding is becoming an increasingly important issue. Educators in every school district should resolve it in advance. **END**

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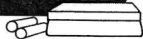
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